

REMARKS

This Response After Final Rejection is in response to the Final Official Action mailed December 13, 2001 and is submitted to put the pending case into condition for allowance thereof or into better condition for appeal. Consideration and entry of this Amendment are respectfully requested.

Claims 1, 2, 4-7, 12-16, and 28-33 remain in the application.

I. Request for Withdrawal of Finality

The current Final Office Action is improper as being premature and should be withdrawn. The Amendment filed by the Applicants on September 21, 2001 pointed out that the Office, in its June 21, 2001 Office Action, did not present proper rejections for claims 1, 2, 4-7, and 29-31, because the Office Action stated that claim 1 had been rejected as obvious over the Hembree patent in view of the Hembree et al. patent and the Domadia patent, yet only the Hembree patent was applied to reject independent claim 1 and oddly the Office Action used "Farnworth et al." against claim 1. Applicants had to assume that the Farnworth et al. reference was U.S. Patent No. 5,634,267 issued June 3, 1997, as there was no indication of the patent number in the Office Action. Since the Farnworth patent was not indicated as being a patent that the Office had used in the rejection of claim 1, the Applicants were not given a clear indication of the basis of rejection.

In the current Office Action, the Office attempts to gloss over the error on page 10 in the "Response to Arguments" in part A and B by stating that the Farnworth et al. was "cited teaching the conventional solder ball placement interchangeably on die or carrier substrate (Col. 4, line

10-25) to meeting the desired interconnection requirement" (Section A) and by giving a description of the teachings of the Farnworth et al. patent (Section B). However, with these statements, the Office has condemned itself. The Office Action was clearly relying on the Farnworth et al. patent and did not indict this patent as a basis for the rejection. More disturbingly the Office Action did not give the Applicants the patent number of the Farnworth et al. patent. The Applicants had to assume it was the patent listed on the PTO-892. However, Warren Farnworth of Micron Technology, Inc. is an inventor of over 250 issued U.S. patents. Thus, it was only a guess by the Applicants and the Office has yet to clearly identify the patent number of the Farnworth et al. patent.

Again, as set forth in Section 706 of the MPEP: "... The goal of examination is to clearly articulate any rejection early in the prosecution process so that the applicant has the opportunity to provide evidence of patentability and otherwise reply completely at the earliest opportunity." Furthermore, MPEP 706.02j states that "[i]t is important for an examiner to properly communicate the basis for a rejection so that the issues can be identified early and the applicant can be given fair opportunity to reply."

The confusing inclusion of the Farnworth patent without stating that it is being relied upon by the Office resulted in the Office not communicating a clear basis for a rejection, and denied the Applicants an opportunity to reply to any issues that the Office might have had if the claims had been properly examined. Thus, as claims 1, 2, 4-7 and 29-31 were not properly examined by the Office, no Final Action should have been issued with regard to these claims. However, the Office nonetheless improperly issued this Final Rejection.

As the previous Office Action did not communicate a proper basis for the rejection of claims 1, 2, 4-7, and 29-31, and, thus, denied the Applicants an opportunity to reply to any issues that the Office might have had if the claims had been properly examined, the present Final Office Action is premature and the Applicants respectfully request that the Final Office Action be withdrawn.

II. 35 U.S.C. § 103(a)

M.P.E.P. 706.02(j) sets forth the standard for a Section 103(a) rejection:

To establish a *prima facie* case of obviousness, three basic criteria must be met. First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or combine reference teachings. Second, there must be a reasonable expectation of success. Finally, the prior art reference (or references when combined) must teach or suggest all the claim limitations. The teaching or suggestion to make the claimed combination and the reasonable expectation of success must both be found in the prior art, and not based on applicant's disclosure. *In re Vaack*, 947 F.2d 488, 20 USPQ2d 1438 (Fed. Cir. 1991).

A. Claims 1, 2, 4-7 and 29-31 - Hembree (U.S. Patent 5,783,461) in view of Hembree et al. (U.S. Pat. 5,931,685)

Claims 1, 2, 4-7, and 29-31 stand rejected under 35 U.S.C. § 103(a) as being obvious over U.S. Patent No. 5,783,461 issued July 21, 1998 to David Hembree (hereinafter "the Hembree patent") in view of U.S. Patent No. 5,931,685 issued August 3, 1999 to Hembree, Jacobson, Wark, Farnworth, Akram and Wood (hereinafter "the Hembree et al. patent") (Office Action, pages 2-5).

1. Independent Claim 1 and Dependent Claims 2 and 4-7

Although the Office Action states that claim 1 has been rejected as obvious over the Hembree patent in view of the Hembree et al. patent, the Office Action has yet again used "Farnworth et al." against claim 1. Again, the Office Action has not stated a patent number for the "Farnworth et al." patent and again the Applicants are assuming that this reference is U.S. Patent No. 5,634,267 issued June 3, 1997, as there is no indication of the patent number in the Office Action. Since the Farnworth patent is not indicated as being a patent that the Office has used in the rejection of claim 1, the Applicants have not been given a clear indication of the basis of rejection.

Yet again, as set forth in Section 706 of the MPEP: "... The goal of examination is to clearly articulate any rejection early in the prosecution process so that the applicant has the opportunity to provide evidence of patentability and otherwise reply completely at the earliest opportunity." Furthermore, MPEP 706.02j states that "[i]t is important for an examiner to properly communicate the basis for a rejection so that the issues can be identified early and the applicant can be given fair opportunity to reply."

The confusing inclusion of the Farnworth patent without stating that it is being relied upon by the Office has resulted in the Office not communicating a clear basis for a rejection, and has denied the Applicants an opportunity to reply to any issues that the Office might have had if the claims had been properly examined. Thus, again, claims 1, 2, 4-7 and 29-31 have not been properly examined by the Office.

Nonetheless, the Applicant will attempt to respond to the rejection based on the body of the rejection, which uses the Hembree patent, the Hembree et al., and the Farnworth et al. patent.

The Office Action at page 3 states that: "Hembree fails to specify using microbumps/solder balls attached to the substrate/first substrate contact and the interposer substrate being a motherboard. However, it is conventional in the chip interconnection technology art to attach the solder balls/bumps on any substrate such as die, carrier, interposer, etc. and to incorporate an interposer/carrier substrates such as expansion card, motherboard, MCM card, etc. to achieve interconnection, testing and design requirements."

This, of course, begs the question "If this is so conventional, why can't the Office cite a reference on point?" The Office has sent four Office Action and has yet to cited a reference. Merely stating that it is "conventional" does not make it so.

The Office has yet again missed the point that the Hembree patent is directed to "[a] temporary package for testing semiconductor dice". As has been previously stated by the Applicant in previous responses, the presently claimed invention is directed to removably attaching a substrate to a motherboard for the fabrication a microelectronic device rather than contacting a substrate to a temporary/testing device. The Hembree patent neither teaches nor suggests a non-reflow electrical contact with a solder ball between a substrate and a motherboard, nor is such "conventional in the art" as asserted by the Office.

The Office Action at page 3 states that the admitted prior art discloses attaching microelectronic device to conventional carrier/interposer substrates. However, the Office Action neglects to recognize that the admitted prior art discloses reflow attachment of the microelectronic device, not non-reflow attachment as claimed in the present application.

The Office Action at page 11 attempts to rebut the Applicants contention in the "Response to Arguments" by basically stating that components of temporary package for

functional are the same as those of conventional fabrication. However, the Office has stated no support for such an erroneous statement. In an attempt to support the contention, the Office cites the entire "Detailed Description of the Preferred Embodiment" of the Hembree patent (col. 3-8). This broad sweep over the Hembree patent is not helpful to the Applicants and illustrates the weakness of the contention. The Hembree patent has been reviewed and no such teaching exists therein. The Office is respectfully reminded that MPEP 706.02(j) states that "[i]t is important for an examiner to properly communicate the basis for a rejection so that the issues can be identified early and the applicant can be given fair opportunity to reply." The Office is further respectfully reminded that M.P.E.P. 706.02(j) also requires that "there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or combine reference teachings" for a proper Section 103(a) rejection. The Office has shown no such suggestion or motivation.

The Office Action at page 3 further states that: "The cited reference by Farnworth et al. teach using solder ball placement interchangeably on die or carrier substrate (Col. 4, line 10) to meet the interconnection requirements". However, the sentence cited at column 4, lines 10-14 states, in total:

The temporary interconnection is formed in a configuration which accommodate a particular die bondpad configuration (e.g., peripheral, array, edge connect, end connect, lead over chip (LOC) and bondpad structure (e.g., flat pad, solder ball, bumped pad).

As the cited passage says nothing about using solder ball placement interchangeably on the die or carrier substrate, it is not clear to the Applicants why the Office believes that it teaches that. Unless, this Farnworth patent (i.e., the one that the Applicants guessed) was not intended to

be the reference, which has resulted in the Applicant not being allowed to respond to the proper rejection.

The Office Action at page 3 continues with the contention that "Hembree et al. teach forming non-reflow solder ball contacts (12, 12A, 12B, etc. in Fig. 1B, 4, 6A, 8A, 10A, etc.; Col. 5, line 40; Col. 5-8) extending between the substrate contacts." However, as with the Hembree patent, the Hembree et al. patent deals with "interconnect for making temporary electrical connections with bumped semiconductor components" (which is the title of the patent). The Hembree et al. patent does not overcome the deficiencies of the Hembree patent, as it neither teaches nor suggests a non-reflow electrical contact with a solder ball between a substrate and a motherboard.

Neither the Hembree patent nor the Hembree et al. patent (nor the inappropriately applied Farnworth patent), either alone or in combination, teach or suggest the presently claimed invention in independent claim 1. Thus, reconsideration and withdrawal of the Section 103(a) rejection of independent claim 1 are respectfully requested.

With regard to claims 2 and 4, the Office Action at page 3 states that "Hembree disclosures the substrate/first substrate comprising a microelectronic package/carrier substrate/microelectronic device." However, this does not overcome the deficiencies referenced above for independent claim 1, from which claims 2 and 4 depend. Thus, for the reasons stated above for claim 1, reconsideration and withdrawal of the Section 103(a) rejection of claims 2 and 4 are respectfully requested.

With regard to claim 5, the Office Action at page 3 states that "Hembree disclosures an interposer substrate/motherboard contact/non-reflow electrical contact comprising a recess

defined by sidewalls (vertical and inclined) extending into second substrate and conductive material layered in the recess (Fig. 5 and 5A; Col. 6, lines 34-65).” As previously pointed out by the Applicants in their September 21, 2001 Amendment, the statement by the Office Action is simply incorrect. The Hembree neither teaches nor suggests the use of a motherboard and the Office Action admits that in the rejection of claim 1, as discussed above. Thus, the deficiencies referenced above for independent claim 1, from which claim 5 depend have not been overcome with the Office Action’s additional contention. Thus, for the reasons stated above for claim 1, reconsideration and withdrawal of the Section 103(a) rejection of claim 5 are respectfully requested.

With regard to claim 6 and 7, the Office Action at page 4 references the various configurations of contacts as allegedly shown in the Hembree et al. patent. The Office Action again uses the phrase “motherboard” as a teaching in the Hembree et al. patent. This is also an incorrect statement. The Hembree et al patent also relates to temporary packaging for testing semiconductor dice. Again, the presently claimed invention is directed to removably attaching a substrate to a motherboard for the fabrication a microelectronic device rather than for temporary/testing purposes. The Hembree et al. patent neither teaches nor suggests a non-reflow electrical contact with a solder ball between a substrate and a motherboard. It must be kept in mind that by not individually addressing each and every configuration of contact discussed by the Office Action does not mean that the Applicants agree with the characterization as set forth in the Office Action. The rejection is simply moot for the reasons stated and no further discussion is warranted.

Furthermore, the addition of the Hembree et al. patent to the rejection does not overcome the deficiencies referenced above for independent claim 1, from which claims 6 and 7 indirectly depend. Thus, for the reasons stated above for claim 1, reconsideration and withdrawal of the Section 103(a) rejection of claims 6 and 7 are respectfully requested.

With regard to claims 29-31 (which either directly or indirectly depend from claim 1), the Office Action merely states that they are rejected as explained for claims 1 and 5-7. Thus, for the same reasons stated for the allowability of claim 1 and 5-7 are equally applicable to this rejection and are hereby incorporated herein by reference as though repeated in total. Thus, reconsideration and withdrawal of the Section 103(a) rejection of claims 29-31 are respectfully requested.

The current Section 103(a) rejection is without merit. Therefore, Applicants respectfully request reconsideration and withdrawal of the rejection of claims 1, 2, 4-7 and 29-31.

B. Claims 12 and 15 – the Hembree patent in view of the Hembree et al. patent

Claims 12 and 15 stand rejected under 35 U.S.C. § 103(a) as being obvious over the Hembree patent in view of the Hembree et al. patent (Office Action, page 6).

With regard to claim 12, the Office Action at page 6 states that “[t]he teachings of Hembree and Hembree et al. apply to Claim 12 as explained above for claims 1 and 5”. That is the extent of the rejection. However, independent claim 12 contains similar limitations to those in independent claim 1 (from which claim 5 depends). Thus, the reasoning set forth for overcoming the rejection of independent claims 1, set forth above, applies equally to independent claim 12 and is hereby incorporated by reference herein. Therefore, as the independent claim 12

includes similar limitation to those in independent claim 1, the Hembree patent and the Hembree et al. patent (and the Farnworth patent, if the Applicants' assumption of inclusion thereof is correct) also fail to teach or suggest the limitations of independent claim 12. Thus, independent claim 12 is allowable and its dependent claim 15 is also allowable on the same basis. Thus, the arguments made in the Office Action at page 6 with regard to the dependent claim 15 is moot.

Thus, for the reasons stated above, reconsideration and withdrawal of the Section 103(a) rejection of claims 12 and 15 respectfully requested.

C. Claims 13, 14, and 16 – the Hembree patent in view of the Hembree et al. patent and the Domadia patent

Claims 13, 14, and 16 stand rejected under 35 U.S.C. § 103(a) as being obvious over the Hembree patent in view of the Hembree et al. patent and U.S. Patent No. 5,949,137 issued September 7, 1999 to Domadia, et al. (hereinafter "the Domadia patent") (Office Action, pages 6-7).

As previously discussed, independent claim 12 is allowable. Thus, its dependent claims 13, 14 and 16 are also allowable on the same basis and the arguments with regard to claim 12 above are incorporated herein by reference.

However, the Applicant would like to point out a fallacy in the discussion of the rejection of claims 13, 14, and 16. The Office Action at page 7 states that "it would have been obvious to the person of ordinary skill in the art at the time [the] invention was made to incorporate the retention devices comprising a plurality of bolts and nuts extending through the backing plate,

frame and thermal plate to reduce the mechanical stress on the device using Domadia et al.'s retention device Hembree's assembly."

First, the Applicants disagree with the Office's characterization of the backing plate, frame and thermal plate with the elements taught in the Hembree patent. However, as stated in the September 21, 2001 Amendment, the more important point is that one skilled in the art would not even remotely have considered placing a frame retained by nuts and bolts, because the Hembree patent relates to an assembly for temporary/testing purposes. The placement and proper tightening of nuts and bolts would take far too long for any testing procedure. That is why the Hembree patent teaches and illustrates simple clips to quickly snap the dice under test in and out of the assembly. Thus, the Office's contention is without merit.

The Office Action at page 11 attempts to rebut the Applicants contention in the "Response to Arguments" by basically stating that the Hembree patent shows clips and clamps and Domadia et al. patent shows bolts/nuts, so they can be combined. This is, of course, insufficient the Office is required to show that "[t]he teaching or suggestion to make the claimed combination and the reasonable expectation of success must both be found in the prior art, and not based on applicant's disclosure. *In re Vaack*. The Office Action has not done so. Further, the Hembree patent deals with a test apparatus and the Domadia et al. deals with a microelectronic package. Again, as stated above and in the September 21, 2001 Amendment, one skilled in the art would one skilled in the art would not even remotely have considered placing a frame retained by nuts and bolts in the structure of the Hembree patent, because the placement and proper tightening of nuts and bolts would take far too long for any testing

procedure, and the Office Action has shown no teaching or suggestion to combine such disparate patents. The Office has not addressed this contention and cannot simply ignore this issue.

Thus, for the reasons stated above, reconsideration and withdrawal of the Section 103(a) rejection of claims 13, 14, and 16 are respectfully requested.

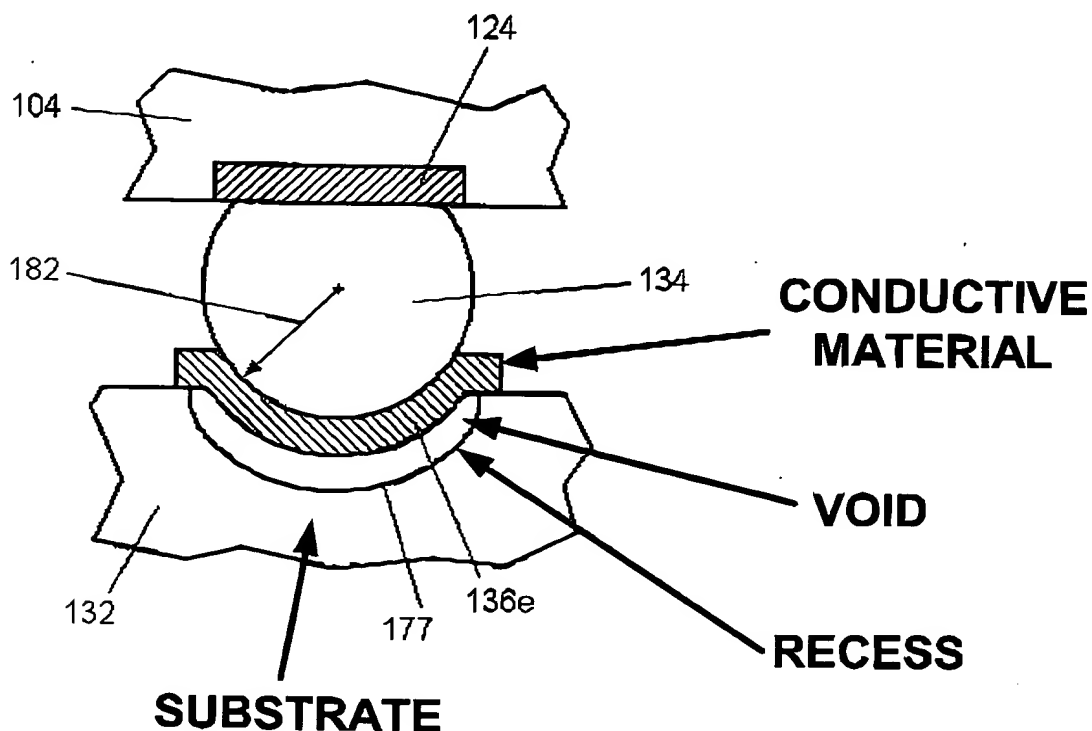
D. Claims 28 – the Hembree patent in view of the Hembree et al. patent

Claim 28 stands rejected under 35 U.S.C. § 103(a) as being obvious over the Hembree patent in view of the Hembree et al. patent (Office Action, page 8).

The Office Action at page 8 correctly admits that the Hembree patent does not teach a conductive material layered over the recess forming a void therebetween. The Office Action continues with a litany of contents which are not relevant to the limitations of claim 28, and then states: "Furthermore, Hembree et al. teach using the recess where the conductive material layered in the recess forms a void therebetween (Fig. 6A and 3)." This contention is wholly without merit.

Fig. 6A and 3 simply shows a recess having a conductive material plated directly to the recess. There is no void formed between the conductive material and the recess, as claimed in claim 28. The Applicants have repeatedly directed the Office to the language of the limitations in claim 28 and to FIG. 2e. However, Applicants respectfully contend that the Office has not carefully considered the language of the claims. Therefore, the Applicants have inserted the claim 28 and figure 2e (one possible embodiment of claim 28), wherein the limitations of claim 28 are referenced on FIG. 2e.

28. A substrate contact for forming a non-reflow electrical contact with a solder ball, comprising:
a recess defined in a substrate by at least one surface extending into said substrate; and
a conductive material layered over said recess forming a void therebetween.

FIG. 2e

Therefore, it should be clear that neither the Hembree patent nor the Hembree et al. patent either teach or suggest the claim limitation of a void formed between the conductive material and the recess. Thus, the rejection presented in the Office Action is without merit and claim 28 is allowable over the cited art.

E. Claims 32 and 33 – the Hembree patent in view of the Hembree et al. patent

Claims 32 and 33 stand rejected under 35 U.S.C. § 103(a) as being obvious over the Hembree patent in view of the Hembree et al. patent (Office Action, page 9).

The Office appears to contend that the Hembree and Hembree et al. patent teaches or suggests a contact with a semispherical surface which is substantially the same radius as a radius of said solder. Although the Hembree et al. broadly sweeps in a possible shapes and sizes, it simply does not teach or suggest matching the radius between the solder ball and the contact as presently claimed.

Thus, reconsideration and withdrawal of the Section 103(a) rejection of independent claim 32 and its dependent claim 33 are respectfully requested.

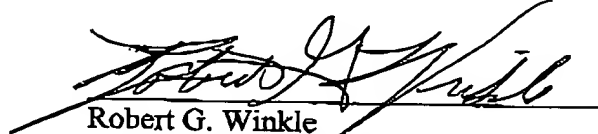
III. Response to Arguments

The Applicants rebuttals to the Office's "Response to Arguments" are included within the "Request for Withdrawal of Finality" and the responses to the Section 103(a) rejections above.

In view of the foregoing remarks, the Applicants request favorable reconsideration and allowance of the application.

Please forward further communications to the address of record. If the Examiner needs to contact the below-signed attorney to further the prosecution of the application, the contact number is (503) 712-1682.

Respectfully submitted,

A handwritten signature in black ink, appearing to read "Robert G. Winkle", is written over a horizontal line.

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Dated: February 13, 2002